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The paraprofessional who is a programed tutor can make a significant contribution to the teaching of reading as a technician whose duties and responsibilities are carefully limited and defined. Tutors are usually housewives with at least a high school education. They are required only to judge the correctness of reading responses and the acceptability of question answers. During the development of programed tutoring, more than 3,000 children have been tutored in about 60 schools. There are now 10 operational programs designed to teach the basic reading skills. Research indicates that programed tutoring used as a supplement to regular classroom teaching is more effective than either method alone. The results of a recent field test comparing programed tutoring and directed tutoring in which the subjects were 120 first-grade students in 20 Indianapolis schools suggest that programed tutoring, in its present form, utilized twice daily in 15-minute sessions as a supplement to conventional classroom instruction can significantly improve reading achievement. However, further research is needed to discover the conditions under which programed tutors make significant contributions to learning. Their degree of effectiveness finally must be evaluated by the performance of the children they teach. (BS)

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A Report on Programed Tutoring

PRE-CONVENTION INSTITUTE VI
USE OF PARA-PROFESSIONALS IN THE TEACHING OF READING

Wednesday, April 24, 1968

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Before reporting on my work with programed tutoring, which provides a very specialized approach to the use of para-professionals in the teaching of elementary reading, I would like to make a few remarks on the history and scope of the more general topic, the use of Para-professionals in teaching.

The use of people who are not professional teachers to make a contribution to teaching is not new and the scope of this practice is broad. As we might expect, the Greeks were among the first; they used slaves as teachers. But it is not entirely clear whether this is a case of para-professional teaching or a commentary on the state of the teaching profession in 300 B. C.

In Biblical times in Palestine we find many examples of very distinguished para-professional teachers, including Moses, who, professionally, was a sheepherder; Joseph the carpenter, who used the apprenticeship system to teach his son the trade; Jesus, who began by teaching the elders in the temple, and later became one of the best-known professional teachers, and finally Philip. who is known for his work in the field of reading. To quote:

> A eunuch ... had come to Jerusalem to worship and was returning; seated in his chariot, he was reading the prophet Isaiah. Philip ran to him and heard him reading...and asked, "Do you understand what you are reading?" And he said, "How can I unless someone guides me?" And he invited Philip to come up and sit with him. Acts 8:27-31

In early human societies there were no professional teachers; it was customary for the elders to teach the young, so that it is not unreasonable to say that the para-profession came before the profession. In any case it is evident that our culture has a long tradition of teaching by those who were not trained as teachers. Even today, the professional teacher has not entirely replaced the para-professional parent, grandparents and big brother.

One practice with a long history is the use of older and more advanced pupils to teach the younger. One of the best institutional examples goes back at least to 1787. In that year a school called the Male Asylum was founded in Madras, India, by an Englishman, Dr. Andrew Bell. The system of teaching in Bell's school was patterned after an even earlier Indian model which delegated part of the task of teaching to advanced students. Let me quote from a book published in 1915 by Narendra Nath Law, The Promotion of Learning in India by Early European Settlers:

> The method of education followed in this school was a new one. Dr. Bell had for a long time watched the system pursued in the village schools in Southern India, and the system which he prescribed for the school in his charge was a variation of this indigenous method. This method is known in England as the Bell System, which Dr. Bell has explained in his book entitled An Experiment in Education. The system is also called the Madras System, or the Pupil-Teacher System. It consisted in the elder or more advanced students teaching the younger. Each class of boys had an equal number of teachers and pupils. The teachers promoted to the next higher class became the taught, and

at the next promotion became teachers of the new-comers. By this arrangement the master could do without assistants, an usher alone being needed. The system is no doubt excellent so far as elementary education is concerned.

James Cordiner, who followed Bell as headmaster of the school in Madras was very favorably impressed with the system as he saw it under Bell. In his book, Voyage to India, he wrote:

> From the perpetual agency of this system, no idlers can exist. On entering the school, you can discover no individual unemployed, nobody looking vacantly around him. The whole is a picture of the most animated industry .... The system creates general activity and attention; it gives, as it were, to the master the hundred hands of Briareus, the hundred eyes of Argus, and the wings of Mercury.

This is certainly a glowing testimonial to the value of para-professionals in the classroom. It also points to the problem which leads to the use of para-professionals; the classroom teacher needs more hands, eyes and ears. I am not quite clear on the value of wings.

Bell returned to England in 1798 and established similar schools there. At about the same time, also in England, Joseph Lancaster independently established a number of schools on a plan similar to Bell's, called the "monitor system." The two systems were widely used to extend education to the children of the poor at a time when little money was available for that purpose.

Both systems were eventually abandoned, although some remnants remain in the systems of education in England and South India. The practice teaching required of professionals in our own system began in England as a requirement of experience as a monitor.

It may have been that the monitor system failed because it was too successful, since there was much resistance to it from the church and from the upper classes who opposed universal education unless it was religious training.

There are also indications that the system was misused in order to take advantage of the economy it promised. Lancaster himself suggested that with this system, one master could educate a thousand children. At the beginning of the nineteenth century trained teachers were scarce and monitors were often given complete charge of classes without adequate supervision. In some cases entire schools were established without a

single qualified teacher. Other dangers of misuse of the system are suggested in the following quotation from an article on Lancaster in the Encyclopedia of Social Sciences:

> Cheapness, simplicity and widespread public approval led to a rapid multiplication of monitorial schools, but their influence on elementary education was harmful. The system was alien to experiment and inquiry, magnified the importance of reading and reduced the teacher to the supervising of transient, ignorant and unskilled monitors. Its cheapness was a reproach to all other reformers, and its mechanical simplicity developed a routine procedure from which escape has proved long and difficult.

None of these consequences necessarily follow if para-professionals are properly used. But they should serve as warning that para-professionals can be sadly misused.

At the present time the use of para-professionals in the classroom is on the increase in this country. Both volunteers and funds to pay for assistance are becoming increasingly available as the general public, especially parents, show a greater interest in education. This is a desirable state of affairs, but it leads to certain questions, not to say problems, for the teachers

and administrators who wish to make the best use of para-professionals. How can they best be used to aid the teacher?

Let us first look at some of the ways in which para-professionals are now being used. For the most part, they are responsible to the classroom teacher. In that case they are properly called teacher's aides. This title does not apply to all of the para-professionals who work in the schools, however, since some are not directly responsible to the teacher. This is the case for programed tutors as they have been used on my project. If, as seems likely, the use of teacher's aides becomes institutionalized to the point that they receive special training, it is probable that identifying titles will be developed for several different para-professions with different duties and responsibilities.

At the present time three kinds of activities are commonly assigned to non-professionals in the schools.

1. First are activities which do not involve teaching. These include housekeeping, clerical work, child care, feeding and mothering, supervision of recreation, operation of audio-visual equipment, and the filing and distribution of supplies, books and programed instruction materials.

2. Second, para-professionals carry out or assist the teacher in teaching-support activities. They organize

and conduct field trips, read or tell stories, and supervise study periods, learning games and special projects.

3. Third, they may actually teach or assist in teaching with varying degrees of professional supervision. They may take charge of the class or part of it when the teacher is busy elsewhere. They may work with children as they study individually or in groups, or they may actively tutor or teach.

Insofar as these activities can be delegated, all of them serve to relieve the load on the classroom teacher and enable her to distribute her own time more effectively.

The activities listed under the first two of the categories present chiefly administrative problems. Most of them can be carried out by any mature well-organized person with a minimum of supervision; the classroom teacher has little difficulty in determining whether her assistants are competent or what training is necessary. The third catagory, however, involves questions of policy. Insofar as teaching is a profession that requires several years of special training, we need to examine very carefully the extent to which teaching functions can or should be delegated to persons who do not have this training.

One answer to the question concerning the proper function of para-professionals in the schools has already

been given; in some states non-professionals are legally prohibited from undertaking <u>any</u> teaching activity.

It is to be hoped that the negative policy decision represented in these laws will not be extended and that it can be reconsidered where it has already been made. There are technical questions yet to be answered concerning the most effective distribution of teaching activities between professional and para-professional, and the conditions under which the para-professional can make the greatest contribution , but there is little doubt that the effectiveness of the professional teacher and of the schools as a whole can be increased by delegating parts of the teaching process to those less qualified. Among the more pressing questions are: what parts of the teaching process can be delegated; how should the para-professionals be trained to carry out these functions, and how should they be supervised? Action based on answers to these questions may well change the role of the professional teacher and the organization of classroom teaching. It is likely that the professional will spend less time in routine tasks, both teaching and non-teaching, and more time in activities that truly require professional teaching skills and in organizing and supervising the work of others.

My own work and that of my colleagues, Dr. Larry Barber, Dr. Phillip Harris and Mrs. Renie Adams, has some bearing on this question. It adds to our information concerning aspects of teaching that can be delegated to non-professionals and clearly defines one set of conditions under which they can make an effective contribution. This work reflects very conservative assumptions concerning the teaching functions of paraprofessionals. It is not assumed that the programed tutor is a professional teacher, junior grade. She is assumed to be a technician whose duties and responsibilities are very carefully delimited and explictly defined. Every effort is made to minimize the professional judgment required. The programed tutor is required to judge the correctness of reading responses and the acceptability of answers to questions, but beyond this she simply serves as voice and hands for the professionals who designed and tested the tutoring programs. Her teaching behavior is controlled almost to the last act and word, first by content programs which specify what is taught and the order in which it is presented; second, by operational programs which specify her teaching activities in great detail and finally, by the characteristics of the individual being tutored as this is reflected in the moment-to-moment responses to the reading task.

The training of the programed tutor is quite different from that of the professional teacher. She is not, except incidentally, taught theory or philosophy of education. She is not, except incidentally, indoctrinated in the goals of education or even the goals of reading instruction. She is not told of the many ways in which reading has been taught or might be taught. Instead, she is given one concrete and explicit set of rules for teaching, rules that have been tested for effectiveness on many children. And she is trained to follow those rules to the letter. Under these conditions her competence is determined by her willingness and ability to follow the programs as instructions rather than by the extent to which her judgment in a teaching situation can substitute for that of the professional teacher.

The development of Programed Tutoring began about eight years ago with an attempt to design automated instructional programs in elementary reading. One purpose was to relieve some very dedicated and talented teachers of some very dull and repetitive drill which they found necessary in teaching retarded children.

The use of machines was abandoned very early in our work because of something which should have been evident at the start. Machines cannot listen, at least they cannot listen well enough to distinguish correct from incorrect oral responses, which we assume to be a necessary

function in the teaching of beginning reading. We began with what might be called "pseudo teaching machines." These were people listening from behind screens with slots in them which looked like teaching machines. Later, it occurred to us that the disguise was not necessary. When the screens were removed, we were left, of course, with tutors. Since their tutoring behavior was controlled by programs similar to those which we had origanlly planned for machines, they were appropriately called programed tutors.

Our first program was a simple paired-associates procedure similar to those used in the psychological laboratory. It was a miniature, designed to teach a list of words by sight-reading only. On the basis of research and field testing which involved the tutoring of many children, this program has been replaced by a number of more versatile full scale teaching programs. Today there are ten operational programs designed to teach major aspects of all of the basic reading skills, including sight-reading, comprehension and word analysis.

Two programs are used to teach sight-reading. One, called Sight-reading, is used at the beginning, when the child knows no words or very few. The second, called Free-reading, is a shorter form used after the child has gained some skill in reading and knows most of the words in the text. The teaching operations in

this program provide less interruption to the continuity required for comprehension. Eight programs are designed to teach comprehension. These include comprehension of instructions, questions, single sentences and more complex units of reading material. Each program is used with material in a different format and emphasizes a different aspect of the total skill of comprehension. The operational programs used to teach sight-reading and comprehension also serve, with different content, to teach word analysis.

Our first tutor was a graduate assistant; our first programs were simple ones used to teach a few sight words to retarded children. Since it was apparent that the tutor was over-qualified, we trained two of the residents of the institution as tutors. The time required for training was approximately two hours, which must establish some sort of a record for minimal qualifications for para-professionals in the educational field. The results were practically, though not statistically significant. Five children taught by these retarded tutors learned at a slightly faster rate than those taught by our research assistant. I will allow you to draw your own conclusions.

Approximately 130 tutors have been trained in programed tutoring. In the early research, undergraduate and graduate research assistants served as

tutors. In more recent field tests all of the tutors and supervisory staff have been housewives, recruited through notices in PTA bulletins and by word of mouth. As minimal qualifications we have required a high school diploma and general competence insofar as this can be judged in a short interview. About half of the tutors came from the suburbs and the remainder from the inner-city areas which provided most of the children. On their own choice, about half of these tutors work a three-hour day, in the morning. The rest work a 5- or 6-hour school day.

As we shifted from the laboratory into the field, that is, from a research to a service setting, and began to use unemployed mothers rather than graduate students as tutors, we found it necessary to simplify our tutoring programs somewhat and to make our instructions more explicit. At the present time, although our programs are determined primarily by the learning characteristics of children, they are also determined, but to a lesser extent, by the capacities of the tutors.

During the development of programed tutoring over 3,000 children have been tutored in about 60 schools. A small number of the children were residents in an institution for retarded children and some were in kindergarten, but the majority were in the first grades

in inner-city schools.

Early research done with children who were not being taught in classrooms indicated that programed tutoring was an effective teaching device when it was used alone, but other evidence indicated that programed tutoring in combination with classroom teaching was more effective than programed tutoring alone. The combination was also more effective than classroom teaching alone. This was true when an equal amount of time was devoted to the three conditions, programed tutoring, classroom teaching and the combination of the two. On the basis of this and similar evidence, we now recommend that programed tutoring be used as a supplement to regular classroom teaching.

But the effectiveness of any teacher or teaching procedure is best measured by improvement in the performance of the children who aretaught. This measure has been applied to programed tutoring from the beginning, but since the programs have been progressively modified, the more recent results are the most relevant.

I would like now to report briefly on the results of a recent field test of programed tutoring. In this study programed tutoring was compared with another method of individual instruction which we call directed tutoring. Programed tutoring is a highly structured teaching procedure derived primarily from learning principles and the technique of programed instruction; directed tutoring

is a less structured method derived from more conventional classroom practice and theory. In directed tutoring, children are given individual instruction through the reading-related activities which a trained teacher would direct a non-professional to use in tutoring sessions designed to supplement classroom reading instruction. It is a carefully selected set of such activities, generously supported with appropriate teaching materials and planned so that the procedures could be carried out by persons with no more educational background, training and supervision than is required for programed tutors. The teaching materials used by the directed tutors were selected and the teaching procedures were designed by a reading specialist in consultation with other experts in reading. Observing directed tutoring in action, there was every reason to believe that the procedures were well designed for the purpose and they were executed conscientiously by the tutors. Everything possible was done to make directed tutoring a first class example of conventional teaching techniques.

The experiment was carried out with children selected to provide a representative sample of the population in about 60 first grade classrooms in 20 inner-city schools in Indianapolis. Programed tutoring was used in 10 schools and directed tutoring in the remaining 10. In all cases it was used as a supplement to classroom teaching.

Children in the experimental groups were chosen at the beginning of the year and a control for each child in these groups was selected later, matched on the basis of Metropolitan Readiness Tests given in September. Children in the experimental groups were given one or two sessions of tutoring daily throughout the school year. Both experimental and control children were given a battery of achievement tests at the end of the year. This battery included an Alphabet sight-reading test, the Ginn Pre-primer and Primer Achievement tests and the Stanford Achievement test.

A modified 2x2x2 matched group design was utilized to examine the effects of three variables: first, tutoring vs. no tutoring; second, programed vs. directed tutoring and third, one vs. two sessions of tutoring daily.

Sixty children were assigned to each experimental group at the beginning of the year; 43 were available in each group at the end of the year. Since the groups were not perfectly matched, the effects of the experimental variables were determined by means of analysis of co-variance. Performance was tested at the end of the school year by 9 measures of reading achievement derived from the Ginn and Stanford reading achievement tests and sub-tests. Since the results are complex and will be reported in detail in the next issue of the

Reading Research Quarterly, I will present only a condensed summary here.

First, only one of the four tutoring conditions produced significant gains in reading achievement. The reading achievement of the group given two sessions daily of programed tutoring was significantly higher than that for its untutored control. Achievement for the group given one session of programed tutoring daily and for both directed tutoring groups, those given one session and those given two sessions daily were not significantly greater than for their matched controls. Second, within the group which benefited from tutoring, the gains were much greater for the slower readers.

(Insert Figure 1 about here)

Figure 1 shows the distribution of Ginn Achievement scores for the group given two sessions daily of programed tutoring and for their controls who were given no tutoring. The slanting lines indicate the quartile divisions in the two distributions. When these scores are corrected for guessing (this is appropriate since the Ginn Achievement Tests are multiple choice tests in which children try all items) we find that the mean number of items answered correctly by the lower quartile of the tutored group is 73% greater than the number answered correctly by the lower quartile of the control group. For the upper

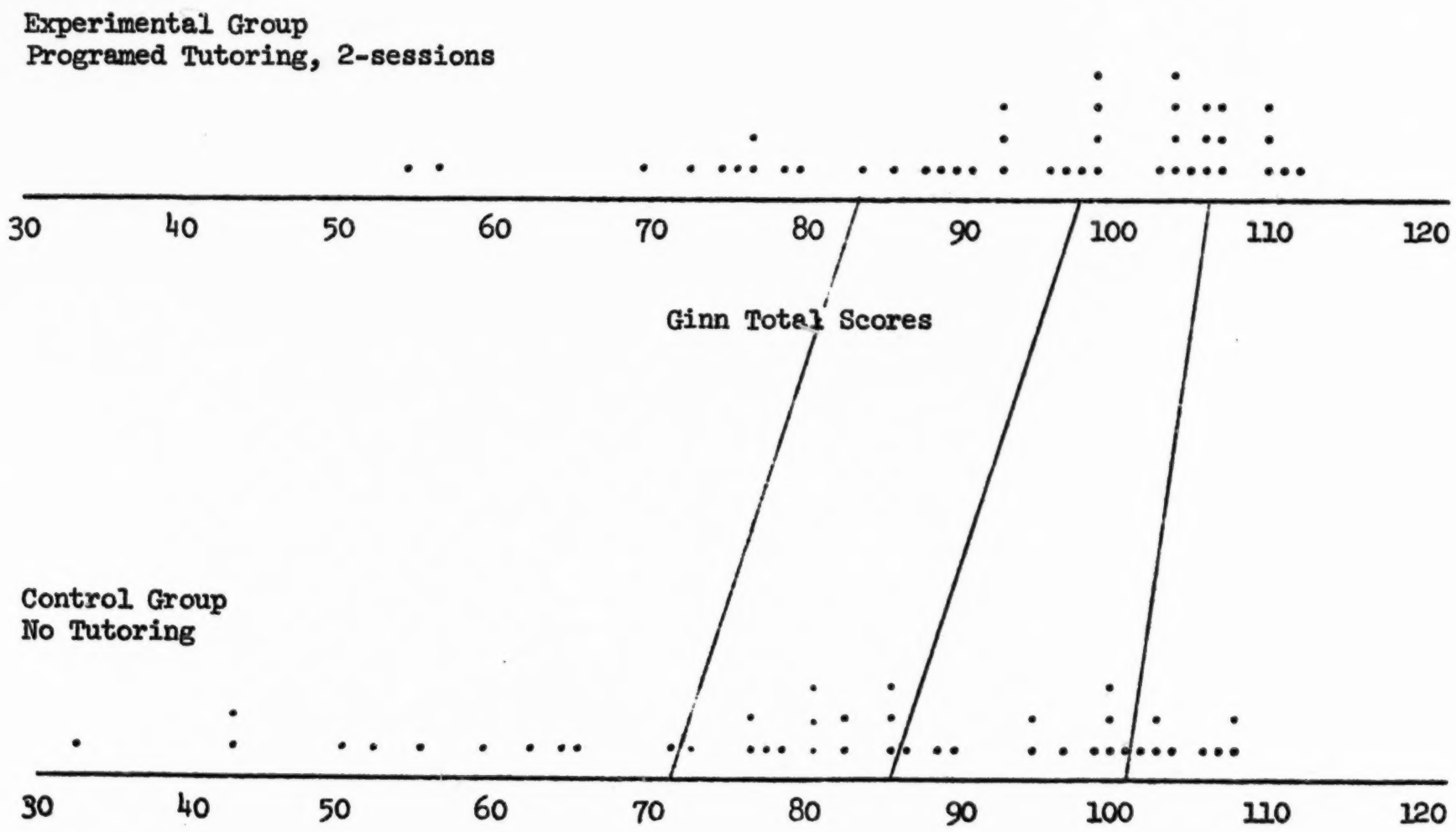

Figure 1

Distributions of total reading achievement scores (Ginn Pre-primer and Primer) for tutored and control groups. Quartiles in each distribution are marked by slanting lines. (Experiment XIV)

quartile, the difference is only 6%.

From these results we can conclude specifically that programmed tutoring in its present form, given to the children in two 15-minute tutoring sessions daily as a supplement to the conventional classroom instruction, can significantly improve the reading achievement of first-graders. For purposes of this institute, however, certain more general conclusions can be drawn. First, these data provide clear evidence, or, since there is much evidence from elsewhere, clear additional evidence that non-professionals can make a real contribution to the teaching function. And it may be worth noting that this contribution is made in one of the most difficult of all teaching areas, namely, beginning reading. Second, it is clear that the success of these non-professionals was critically dependent on the teaching procedures they were trained to use and upon other teaching conditions. The results obtained were definitely related to both the nature of the tutoring operations and to the amount of tutoring. Third, not all children benefitted equally from tutoring. And finally, it is clear that face validity is not an adequate basis for judging the effectiveness of a tutoring program.

In conclusion, it appears that there are conditions under which non-professionals can make a significant contribution to the teaching of reading, but further

research on the conditions under which they can do so is indicated. Their effectiveness must be evaluated objectively in terms of the performance of the children they teach. Good teaching by the non-professional as well as by the professional must be judged from results, not from appearances.